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(54) TERMINAL ELECTRODE STRUCTURE OF THIN FILM CIRCUIT ELEMENT

(57)Abstract:

PURPOSE: To realize cost reduction and remarkably improve conventional restrictions in the siz and accuracy, by arranging conductive resin terminal parts on pads formed at terminal arrangement positions of a thin film circuit element.
CONSTITUTION: Aluminum pads 2 are formed on leading-out electrode parts of a thin film circu element 1. First conductive resin terminal parts 3 are formed on the aluminum pads 2, and secor conductive resin terminal parts 4 are formed on the first conductive resin terminal parts 3. The second conductive resin terminal parts 4 are formed in one shape out of a rectangular pillar shaj a conic shape, a square pyramid shape and a cylindrical shape. Thereby, the formation of termin electrodes for connection is facilitated, a working process is simplified, and cost reduction is realized. Size and accuracy of the terminal electrodes for connection can be improved.

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(51)【国際特許分類第６版】
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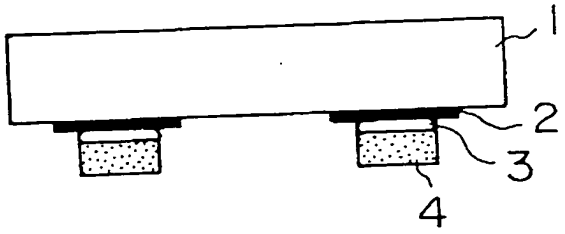
(57)【要約】
【目的】薄膜回路素子の端子電極のコストダウンと寸法精度の向上を図る。
【構成】薄膜回路素子１のアルミニウムパッド２に導電性樹脂の端子部３及び４を形成させたことを特徴とする。



【特許請求の範囲】

【請求項１】　薄膜回路素子の端子配置位置に設けられたパッド上に導電性樹脂端子部を備えたことを特徴とする薄膜回路素子の端子電極構造。

【請求項２】　薄膜回路素子の端子配置位置に設けられたパッド上に第１の導電性樹脂端子部と該第１の導電性樹脂端子部の上に第２の導電性樹脂端子部を備えたことを特徴とする薄膜回路素子の端子電極構造。

【請求項３】　前記第２の導電性樹脂端子部は、角柱形であることを特徴とする請求項２記載の薄膜回路素子の端子電極構造。

【請求項４】　前記第２の導電性樹脂端子部は、円錐形であることを特徴とする請求項２記載の薄膜回路素子の端子電極構造。

【請求項５】　前記第２の導電性樹脂端子部は、四角錐形であることを特徴とする請求項２記載の薄膜回路素子の端子電極構造。

【請求項６】　前記第２の導電性樹脂端子部は、円柱形であることを特徴とする請求項２記載の薄膜回路素子の端子電極構造。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、電子機器に用いられる薄膜回路素子又は配線板の端子電極構造に関するものである。

【０００２】

【従来の技術】図１６は薄膜回路素子の接続用端子電極の従来の構造例を示す断面図である。図１６は、例えば、シリコン（Ｓｉ）の薄膜回路素子１に形成されたアルミニウムパッド２の上に中間金属膜（めっき用）２１を設け、銅めっき２２を行い、その上に、はんだめっき等で接続用の突起（バンプ）２３を設けたものである。

【０００３】図１７は従来の端子電極構造の説明図であり、（Ａ）は金ボール２４を薄膜回路素子１上に金バンプを形成する説明図、（Ｂ），（Ｃ）は薄膜回路素子１上に金ボール２４が設けられた素子を配線基板２５に実装する構造の側面図である。（Ａ）に示したように、上から金線を挿入し、その先端部分を高電圧でスパークさせ加熱溶融してできた金ボール２４を薄膜回路素子１上のアルミニウムパッド上に超音波及び熱により圧着しバンプを形成する。（Ｂ）のように、配線基板２５の配線導体パッド２６上に、予めはんだプリコート２７（予備はんだ）を設けておき、その部分に素子の金ボール２４を対応させ、（Ｃ）のように、両者を圧着して加熱し、金ボール２４とはんだプリコート２７を溶融接合させる。

【０００４】

【発明が解決しようとする課題】しかし、上記従来の構造では、図１６の例の場合、めっき工程等が必要となり複雑な製造手順をとるため薄膜回路素子のコストが高くなる。また、図１７の例の場合、各パッド１つ１つに金ボールの圧着を行うため、パッド数（電極数）が増えると工数がかかり同じくコスト高になってしまう問題がある。また、突起（バンプ）の高さや形状についても、前記従来の工法だとあまり高くできず、高さの精度についてもコントロールが難しく、バンプの形状も球形や半球形もしくは、だ円形状の物しかできない等の問題がある。

【０００５】本発明の目的は、従来技術の問題点であった端子電極の複雑な製造手順を排除して低コスト化を実現し、かつ、従来の寸法や精度の制約を大幅に改善した薄膜回路素子の端子電極構造を提供することにある。

【０００６】

【課題を解決するための手段】本発明の薄膜回路素子の端子電極構造は、薄膜回路素子の端子配置位置に設けられたパッド上に導電性樹脂端子部を備えたことを特徴とするものである。

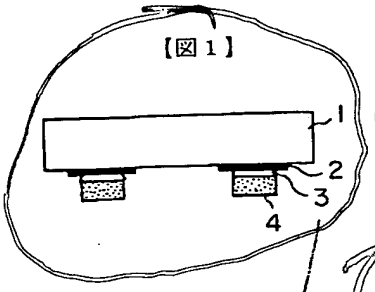
【０００７】さらに、薄膜回路素子の端子配置位置に設けられたパッド上に第１の導電性樹脂端子部と該第１の導電性樹脂端子部の上に第２の導電性樹脂端子部を備えたことを特徴とするものである。上記第２の導電性樹脂端子部は、角柱形，円錐形，四角錐形，円柱形のいずれかであることを特徴とする。

【０００８】

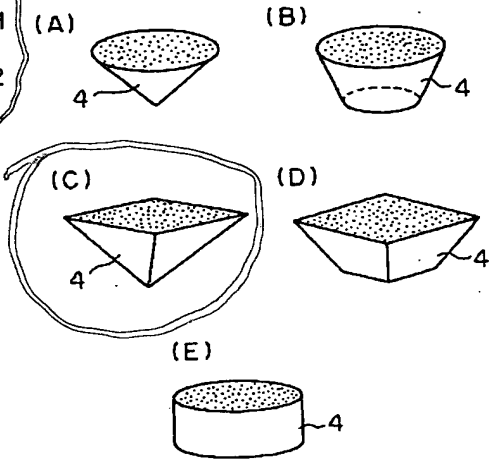
【実施例】図１は請求項２に記載した本発明の第１の実施例を示す側面図であり、１は薄膜回路素子、２はアルミニウムパッド、３及び４は導電性樹脂端子部である。図２は上記本発明の端子部４の各種形状例を示す斜視図である。（Ａ）は円錐形、（Ｂ）は円錐台形、（Ｃ）は四角錐形、（Ｄ）は四角台形、（Ｅ）は円柱形を示す。

【０００９】以下、上記図１に示した本発明の第１の実施例の製作手順について説明する。図３～図８は第１の実施例の製作過程の説明図である。いずれも縦切断部分端面図である。図３は、薄膜回路素子１の引出電極部分にアルミニウムパッド２が形成された状態を示す。図４は治具として用いてる突起形成板５を示し、離型性の良い材質又は、表面に離型処理を施した平板に薄膜回路素子１の電極パッド２の位置と相対する位置に、必要とする突起（バンプ）寸法と同じ大きさのくぼみ６を設けた突起形成板５である。次に、図５のように、突起形成板５に導電性樹脂４を印刷し、くぼみ６にスキージ７によって導電性樹脂４を充填する。そして、突起形成板５を加熱炉（オーブン）に入れて導電性樹脂４を硬化させる。次に、図６に示すように、硬化後、硬化させた樹脂４の上に再度導電性樹脂３をスキージ７によって印刷する。次に、図７のように、突起形成板５のくぼみ６の位置と薄膜回路素子１のパッド２の位置を合わせて貼り合わせる。そして、加熱炉（オーブン）に入れて導電性樹脂３を硬化させると同時に先に硬化させた導電性樹脂４と接合する。次に、図８のように、突起形成板５から、

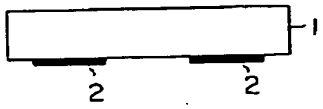
【図１】



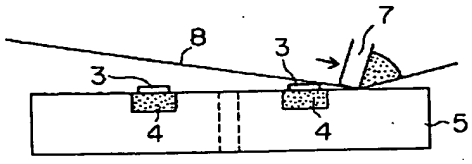
【図２】



【図３】

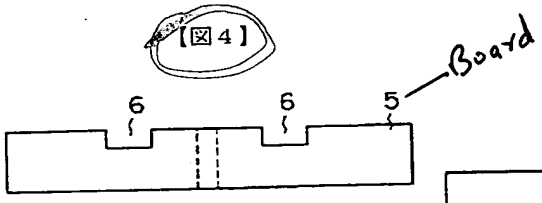


【図６】

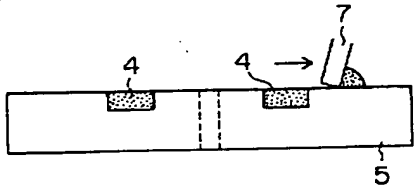


【図９】

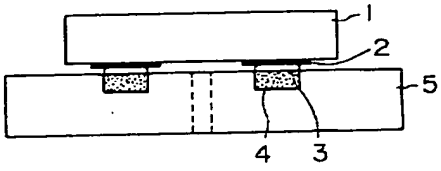
【図４】



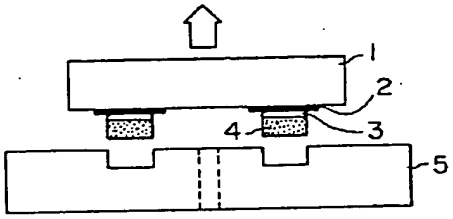
【図５】



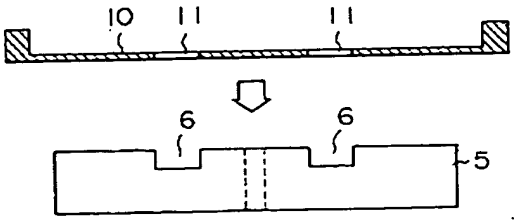
【図７】



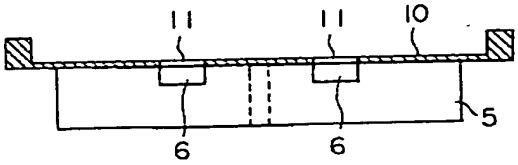
【図８】



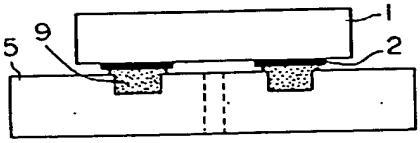
【図１０】



【図１１】



【図１４】



導電性樹脂端子部３，４が形成された薄膜回路素子１を外す。このようにして、図１に示した本発明の第１の実施例の端子電極構造が得られる。

【００１０】図９は請求項１に記載した本発明の第２の実施例を示す側面図である。図１０～図１５は図９の第２の実施例の製作過程を示す説明図である。いずれも縦切断部分端面図である。先ず、図１０のように、離型性の良い材質又は、表面に離型処理を施した平板に薄膜回路素子の電極パッドと同じ位置に、必要とする突起（バンプ）寸法と同じ大きさのくぼみ６を設けた突起形成板５と、それと同じ位置に穴１１を明けたメタルマスク１０を用意する。これらはいずれも治具として使用する。次に、図１１のように、突起形成板５とメタルマスク１０とをくぼみ６と穴１１の位置を合わせてセットする。次に、図１２のように、導電性樹脂をスキージ７で充填し印刷する。次に、図１３のように、メタルマスク１０をとり外した後、突起形成板５のくぼみ６の位置に形成された導電性樹脂端子部９と薄膜回路素子１のパッド２の位置を合わせ、図１４のように貼り合わせる。そのまま加熱炉（オーブン）に入れて導電性樹脂９を硬化させる。次に、図１５のように、突起形成板５から、導電性樹脂端子部９が形成された薄膜回路素子１を外す。このようにして、図９に示した本発明の第２の実施例の端子電極構造が得られる。

【００１１】

【発明の効果】本発明を実施することにより、次の効果が得られる。

（１）接続用端子電極形成が容易になり、作業工程が簡素化される。

（２）薄膜回路素子、又は配線板を複数個一括して多数の端子電極を同時に形成することができる。例えば、ウェハや多数個取付された配線板での処理が可能となる。

（３）上記（１）の理由から従来のプロセスと比較し工数が減るため、低コスト化が図れる。

（４）接続用端子電極の形状，寸法を必要に応じて所望の形状に容易に形成できる。又、高さも高くでき精度も向上する。

（５）上記（４）の理由より、次工程の配線基板への実装工程で実装歩留まりが良くなり、装置の品質，信頼性の向上につながる。

【図面の簡単な説明】

【図１】本発明の第１の実施例を示す側面図である。

【図２】図１の端子部の各種形状を示す斜視図である。

【図３】本発明を適用する薄膜回路素子本体の側面図である。

【図４】本発明の第１の実施例の製作過程説明図である。

【図５】本発明の第１の実施例の製作過程説明図である。

【図６】本発明の第１の実施例の製作過程説明図である。

【図７】本発明の第１の実施例の製作過程説明図である。

【図８】本発明の第１の実施例の製作過程説明図である。

【図９】本発明の第２の実施例を示す側面図である。

【図１０】本発明の第２の実施例の製作過程説明図である。

【図１１】本発明の第２の実施例の製作過程説明図である。

【図１２】本発明の第２の実施例の製作過程説明図である。

【図１３】本発明の第２の実施例の製作過程説明図である。

【図１４】本発明の第２の実施例の製作過程説明図である。

【図１５】本発明の第２の実施例の製作過程説明図である。

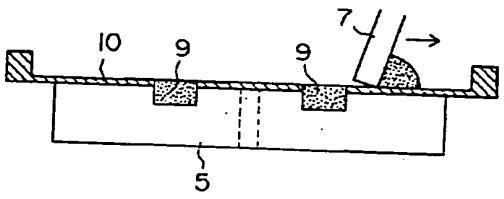
【図１６】従来の端子電極構造例図である。

【図１７】従来の端子電極構造の説明図である。

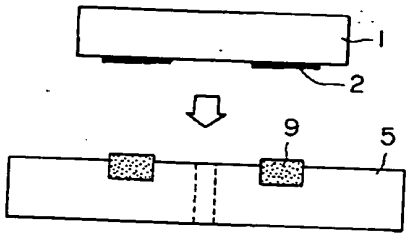
【符号の説明】

１　薄膜回路素子
２　アルミニウムパッド
３，４　導電性樹脂端子部
５　突起形成板
６　くぼみ
７　スキージ
８　マスク
９　導電性樹脂端子部
１０　メタルマスク
１１　穴
２１　中間金属膜
２２　銅めっき層
２３　はんだバンプ
２４　金ボール
２５　配線基板
２６　配線導体パッド
２７　はんだプリコート

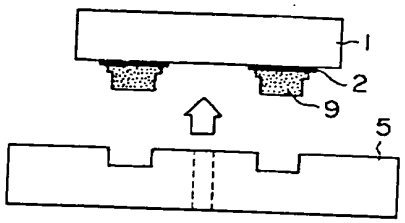
【図１２】



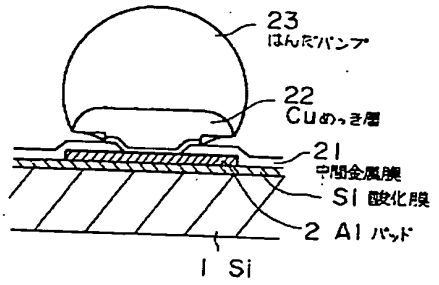
【図１３】



【図１５】



【図１６】



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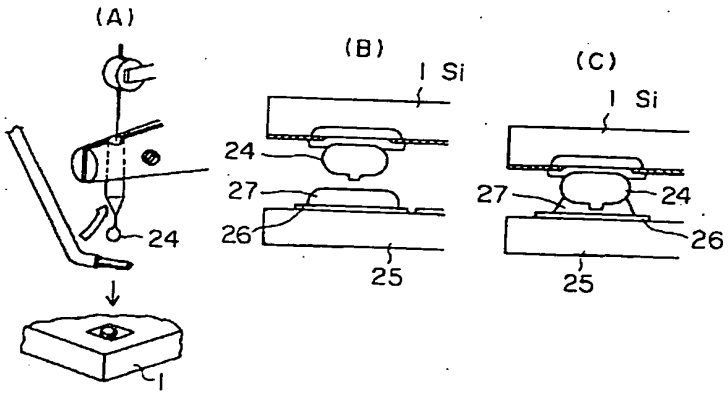

JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

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(54) TERMINAL ELECTRODE STRUCTURE OF THIN FILM CIRCUIT ELEMENT

(57)Abstract:

PURPOSE: To realize cost reduction and remarkably improve conventional restrictions in the siz and accuracy, by arranging conductive resin terminal parts on pads formed at terminal arrangement positions of a thin film circuit element.
CONSTITUTION: Aluminum pads 2 are formed on leading-out electrode parts of a thin film circu element 1. First conductive resin terminal parts 3 are formed on the aluminum pads 2, and secor conductive resin terminal parts 4 are formed on the first conductive resin terminal parts 3. The second conductive resin terminal parts 4 are formed in one shape out of a rectangular pillar sha a conic shape, a square pyramid shape and a cylindrical shape. Thereby, the formation of termin electrodes for connection is facilitated, a working process is simplified, and cost reduction is realized. Size and accuracy of the terminal electrodes for connection can be improved.

LEGAL STATUS
[Date of request for examination]
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9-16-02

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CLAIMS

[Claim(s)]
[Claim 1] Terminal electrode structure of the thin-film-circuit element characterized by having a conductive resin terminal area on the pad prepared in the terminal arrangement position of a thin-film-circuit element.
[Claim 2] the pad top prepared in the terminal arrangement position of a thin-film-circuit element -- the 1st conductive resin terminal area -- this -- the terminal electrode structure of the thin-film-circuit element characterized by having the 2nd conductive resin terminal area on the 1st conductive resin terminal area
[Claim 3] The conductive resin terminal area of the above 2nd is the terminal electrode structure of the thin-film-circuit element according to claim 2 characterized by being a prism form.
[Claim 4] The conductive resin terminal area of the above 2nd is the terminal electrode structure of the thin-film-circuit element according to claim 2 characterized by being a cone.
[Claim 5] The conductive resin terminal area of the above 2nd is the terminal electrode structure of the thin-film-circuit element according to claim 2 characterized by being square drill type.
[Claim 6] The conductive resin terminal area of the above 2nd is the terminal electrode structure of the thin-film-circuit element according to claim 2 characterized by being a cylindrical shape.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the thin-film-circuit element used for electronic equipment, or the terminal electrode structure of a patchboard.
[0002]
[Description of the Prior Art] Drawing 16 is the cross section showing the conventional example of structure of the terminal electrode for connection of a thin-film-circuit element. Drawing 16 forms the middle metal membrane (for plating) 21 on the aluminum pad 2 formed in the thin-film-circuit element 1 of silicon (Si), performs copper plating 22 and forms the salient 23 for connection (bump) with solder plating etc. on it.
[0003] Drawing 17 is explanatory drawing of the conventional terminal electrode structure, and explanatory drawing in which (A) forms a golden bump for the golden ball 24 on the thin-film-circuit element 1, (B), and (C) are the side elevations of the structure of mounting the element with which the golden ball 24 was formed on the thin-film-circuit element 1 in the wiring substrate 25. As shown in (A), a gold streak is inserted from a top, the golden ball 24 which was made to spark a part for the point by the high voltage, carried out heating fusion, and was made is stuck by pressure with an ultrasonic wave and heat on the aluminum pad on the thin-film-circuit element 1, and a bump is formed. Form the solder precoat 27 (pretinning) beforehand on the wiring contact pads 26 of the wiring substrate 25, and the golden ball 24 of an element is made to correspond to the portion, as shown in (B), as shown in (C), both are stuck by pressure and heated and the fused junction of the solder precoat 27 is carried out to the golden ball 24.
[0004]
[Problem(s) to be Solved by the Invention] However, with the above-mentioned conventional structure, in the case of the example of drawing 16 , in order a plater degree etc. is needed and to take a complicated manufacture procedure, the cost of a thin-film-circuit element becomes high. Moreover, in order to stick a golden ball to each pad each of by pressure in the case of the example of drawing 17 , when the number of pads (the number of electrodes) increases, there is a problem which a man day starts and similarly becomes cost quantity. Moreover, with the height or configuration of a salient (bump), if it is the aforementioned conventional method of construction, it cannot do not much highly, but control is difficult also about the precision of height and there is a problem of only a globular form, a semi-sphere form, or an ellipsoidal-like object also being able to do a bump's configuration.
[0005] The purpose of this invention is to offer the terminal electrode structure of a thin-film-circuit element where eliminated the complicated manufacture procedure of the terminal electrode which was the trouble of the conventional technology, and realized low-cost-ization and restrictions of the conventional size and precision have been improved sharply.
[0006]
[Means for Solving the Problem] Terminal electrode structure of the thin-film-circuit element of this invention is characterized by having a conductive resin terminal area on the pad prepared in the terminal arrangement position of a thin-film-circuit element.
[0007] furthermore, the pad top prepared in the terminal arrangement position of a thin-film-circuit element -- the 1st conductive resin terminal area -- this -- it is characterized by having the 2nd conductive resin terminal area on the 1st conductive resin terminal area The conductive resin terminal area of the above 2nd is characterized by being a prism form, a cone, square drill type, or a cylindrical shape.
[0008]
[Example] Drawing 1 is the side elevation showing the 1st example of this invention indicated to the claim 2, and, as for a thin-film-circuit element and 2, an aluminum pad, and 3 and 4 is [1] conductive resin terminal areas. Drawing 2 is the perspective diagram showing the various examples of a configuration of the terminal area 4 of the above-mentioned this invention. In (A), square drill type and (D) show a square trapezoid, and, as for a cone and (B), (E) shows a cylindrical shape, as for a truncated-cone form and (C).
[0009] Hereafter, the fabrication sequence of the 1st example of this invention shown in above-mentioned drawing 1 is explained. Drawing 3 - drawing 8 are explanatory drawings of the manufacture process of the 1st example. All are vertical cutting fragmentary end views. Drawing 3 shows the state where the aluminum pad 2 was formed in the drawer electrode section of the thin-film-circuit element 1. Drawing 4 is the salient formation board 5 which formed the impression 6 of the same size as the salient (bump) size monotonously needed for the position of the electrode pad 2 of the thin-film-circuit element 1 and the position

which faces which showed the salient formation board 5 used as a fixture, and performed mold release processing to the good quality of the material or the good front face of a mold-release characteristic. Next, like drawing 5 , conductive resin 4 is printed to the salient formation board 5, and an impression 6 is filled up with conductive resin 4 by the squeegee 7. And the salient formation board 5 is put into a heating furnace (oven), and conductive resin 4 is stiffened. Next, as shown in drawing 6 , conductive resin 3 is again printed by the squeegee 7 on the stiffened resin 4 after hardening. Next, like drawing 7 , the position of the impression 6 of the salient formation board 5 and the position of the pad 2 of the thin-film-circuit element 1 are doubled, and it sticks. And it joins to the conductive resin 4 stiffened previously at the same time it puts into a heating furnace (oven) and stiffens conductive resin 3. Next, the thin-film-circuit element 1 in which the conductive resin terminal areas 3 and 4 were formed is removed from the salient formation board 5 like drawing 8 . Thus, the terminal electrode structure of the 1st example of this invention shown in drawing 1 is acquired.

[0010] Drawing 9 is the side elevation showing the 2nd example of this invention indicated to the claim 1. Drawing 10 - drawing 15 are explanatory drawings showing the manufacture process of the 2nd example of drawing 9 . All are vertical cutting fragmentary end views. First, the metal mask 10 which ended the hole 11 is prepared for the salient formation board 5 which formed the impression 6 of the same size as the salient (bump) size which performed mold release processing to the good quality of the material or the good front face of a mold-release characteristic, and which is monotonously needed for the same position as the electrode pad of a thin-film-circuit element, and the same position as it like drawing 10 . Each of these is used as a fixture. Next, like drawing 11 , it becomes depressed about the salient formation board 5 and the metal mask 10, and the position of 6 and a hole 11 is doubled and set. Next, like drawing 12 , conductive resin is filled up with a squeegee 7 and printed. Next, like drawing 13 , after taking and removing the metal mask 10, the position of the pad 2 of the conductive resin terminal area 9 formed in the position of the impression 6 of the salient formation board 5 and the thin-film-circuit element 1 is doubled, and it sticks like drawing 14 . It puts into a heating furnace (oven) then, and conductive resin 9 is stiffened. Next, the thin-film-circuit element 1 in which the conductive resin terminal area 9 was formed is removed from the salient formation board 5 like drawing 15 . Thus, the terminal electrode structure of the 2nd example of this invention shown in drawing 9 is acquired.

[0011]

[Effect of the Invention] The following effect is acquired by carrying out this invention.

(1) The terminal electrode formation for connection becomes easy, and a routing is simplified.

(2) Two or more thin-film-circuit elements or patchboards can be put in block, and many terminal electrodes can be formed simultaneously. For example, processing with a wafer or the attached patchboard is attained.

(3) Since a man day becomes fewer from the reason of the above (1) as compared with the conventional process, low-cost-ization can be attained.

(4) The configuration of the terminal electrode for connection and a size can be easily formed in a desired configuration if needed. Moreover, height can also be made high and its precision also improves.

(5) From the reason of the above (4), the mounting yield becomes good at the mounting process to the wiring substrate of the following process, and lead to the quality of equipment, and improvement in reliability.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] this invention relates to the thin-film-circuit element used for electronic equipment, or the terminal electrode structure of a patchboard.

[Translation done.]

* NOTICES *

PRIOR ART

[Description of the Prior Art] Drawing 16 is the cross section showing the conventional example of structure of the terminal electrode for connection of a thin-film-circuit element. Drawing 16 forms the middle metal membrane (for plating) 21 on the aluminum pad 2 formed in the thin-film-circuit element 1 of silicon (Si), performs copper plating 22 and forms the salient 23 for connection (bump) with solder plating etc. on it.
[0003] Drawing 17 is explanatory drawing of the conventional terminal electrode structure, and explanatory drawing in which (A) forms a golden bump for the golden ball 24 on the thin-film-circuit element 1, (B), and (C) are the side elevations of the structure of mounting the element with which the golden ball 24 was formed on the thin-film-circuit element 1 in the wiring substrate 25. As shown in (A), a gold streak is inserted from a top, the golden ball 24 which was made to spark a part for the point by the high voltage, carried out heating fusion, and was made is stuck by pressure with an ultrasonic wave and heat on the aluminum pad on the thin-film-circuit element 1, and a bump is formed. Form the solder precoat 27 (pretinning) beforehand on the wiring contact pads 26 of the wiring substrate 25, and the golden ball 24 of an element is made to correspond to the portion, as shown in (B), as shown in (C), both are stuck by pressure and heated and the fused junction of the solder precoat 27 is carried out to the golden ball 24.

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EFFECT OF THE INVENTION

[Effect of the Invention] The following effect is acquired by carrying out this invention.
(1) The terminal electrode formation for connection becomes easy, and a routing is simplified.
(2) Two or more thin-film-circuit elements or patchboards can be put in block, and many terminal electrodes can be formed simultaneously. For example, processing with a wafer or the attached patchboard is attained.
(3) Since a man day becomes fewer from the reason of the above (1) as compared with the conventional process, low-cost-ization can be attained.
(4) The configuration of the terminal electrode for connection and a size can be easily formed in a desired configuration if needed. Moreover, height can also be made high and its precision also improves.
(5) From the reason of the above (4), the mounting yield becomes good at the mounting process to the wiring substrate of the following process, and lead to the quality of equipment, and improvement in reliability.

[Translation done.]

* * NOTICES *

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, with the above-mentioned conventional structure, in the case of the example of drawing 16 , in order a plater degree etc. is needed and to take a complicated manufacture procedure, the cost of a thin-film-circuit element becomes high. Moreover, in order to stick a golden ball to each pad each of by pressure in the case of the example of drawing 17 , when the number of pads (the number of electrodes) increases, there is a problem which a man day starts and similarly becomes cost quantity. Moreover, with the height or configuration of a salient (bump), if it is the aforementioned conventional method of construction, it cannot do not much highly, but control is difficult also about the precision of height and there is a problem of only a globular form, a semi-sphere form, or an ellipsoidal-like object also being able to do a bump's configuration.

[0005] The purpose of this invention is to offer the terminal electrode structure of a thin-film-circuit element where eliminated the complicated manufacture procedure of the terminal electrode which was the trouble of the conventional technology, and realized low-cost-ization and restrictions of the conventional size and precision have been improved sharply.

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MEANS

[Means for Solving the Problem] Terminal electrode structure of the thin-film-circuit element of this invention is characterized by having a conductive resin terminal area on the pad prepared in the terminal arrangement position of a thin-film-circuit element.
[0007] furthermore, the pad top prepared in the terminal arrangement position of a thin-film-circuit element -- the 1st conductive resin terminal area -- this -- it is characterized by having the 2nd conductive resin terminal area on the 1st conductive resin terminal area The conductive resin terminal area of the above 2nd is characterized by being a prism form, a cone, square drill type, or a cylindrical shape.

[Translation done.]

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EXAMPLE

[Example] Drawing 1 is the side elevation showing the 1st example of this invention indicated to the claim 2, and, as for a thin-film-circuit element and 2, an aluminum pad, and 3 and 4 is [1] conductive resin terminal areas. Drawing 2 is the perspective diagram showing the various examples of a configuration of the terminal area 4 of the above-mentioned this invention. In (A), square drill type and (D) show a square trapezoid, and, as for a cone and (B), (E) shows a cylindrical shape, as for a truncated-cone form and (C).

[0009] Hereafter, the fabrication sequence of the 1st example of this invention shown in above-mentioned drawing 1 is explained. Drawing 3 - drawing 8 are explanatory drawings of the manufacture process of the 1st example. All are vertical cutting fragmentary end views. Drawing 3 shows the state where the aluminum pad 2 was formed in the drawer electrode section of the thin-film-circuit element 1. Drawing 4 is the salient formation board 5 which formed the impression 6 of the same size as the salient (bump) size monotonously needed for the position of the electrode pad 2 of the thin-film-circuit element 1 and the position which faces which showed the salient formation board 5 used as a fixture, and performed mold release processing to the good quality of the material or the good front face of a mold-release characteristic. Next, like drawing 5 , conductive resin 4 is printed to the salient formation board 5, and an impression 6 is filled up with conductive resin 4 by the squeegee 7. And the salient formation board 5 is put into a heating furnace (oven), and conductive resin 4 is stiffened. Next, as shown in drawing 6 , conductive resin 3 is again printed by the squeegee 7 on the stiffened resin 4 after hardening. Next, like drawing 7 , the position of the impression 6 of the salient formation board 5 and the position of the pad 2 of the thin-film-circuit element 1 are doubled, and it sticks. And it joins to the conductive resin 4 stiffened previously at the same time it puts into a heating furnace (oven) and stiffens conductive resin 3. Next, the thin-film-circuit element 1 in which the conductive resin terminal areas 3 and 4 were formed is removed from the salient formation board 5 like drawing 8 . Thus, the terminal electrode structure of the 1st example of this invention shown in drawing 1 is acquired.

[0010] Drawing 9 is the side elevation showing the 2nd example of this invention indicated to the claim 1. Drawing 10 - drawing 15 are explanatory drawings showing the manufacture process of the 2nd example of drawing 9 . All are vertical cutting fragmentary end views. First, the metal mask 10 which ended the hole 11 is prepared for the salient formation board 5 which formed the impression 6 of the same size as the salient (bump) size which performed mold release processing to the good quality of the material or the good front face of a mold-release characteristic, and which is monotonously needed for the same position as the electrode pad of a thin-film-circuit element, and the same position as it like drawing 10 . Each of these is used as a fixture. Next, like drawing 11 , it becomes depressed about the salient formation board 5 and the metal mask 10, and the position of 6 and a hole 11 is doubled and set. Next, like drawing 12 , conductive resin is filled up with a squeegee 7 and printed. Next, like drawing 13 , after taking and removing the metal mask 10, the position of the pad 2 of the conductive resin terminal area 9 formed in the position of the impression 6 of the salient formation board 5 and the thin-film-circuit element 1 is doubled, and it sticks like drawing 14 . It puts into a heating furnace (oven) then, and conductive resin 9 is stiffened. Next, the thin-film-circuit element 1 in which the conductive resin terminal area 9 was formed is removed from the salient formation board 5 like drawing 15 . Thus, the terminal electrode structure of the 2nd example of this invention shown in drawing 9 is acquired.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the side elevation showing the 1st example of this invention.
[Drawing 2] It is the perspective diagram showing the various configurations of the terminal area of drawing 1.
[Drawing 3] It is the side elevation of the thin-film-circuit element main part which applies this invention.
[Drawing 4] It is manufacture process explanatory drawing of the 1st example of this invention.
[Drawing 5] It is manufacture process explanatory drawing of the 1st example of this invention.
[Drawing 6] It is manufacture process explanatory drawing of the 1st example of this invention.
[Drawing 7] It is manufacture process explanatory drawing of the 1st example of this invention.
[Drawing 8] It is manufacture process explanatory drawing of the 1st example of this invention.
[Drawing 9] It is the side elevation showing the 2nd example of this invention.
[Drawing 10] It is manufacture process explanatory drawing of the 2nd example of this invention.
[Drawing 11] It is manufacture process explanatory drawing of the 2nd example of this invention.
[Drawing 12] It is manufacture process explanatory drawing of the 2nd example of this invention.
[Drawing 13] It is manufacture process explanatory drawing of the 2nd example of this invention.
[Drawing 14] It is manufacture process explanatory drawing of the 2nd example of this invention.
[Drawing 15] It is manufacture process explanatory drawing of the 2nd example of this invention.
[Drawing 16] It is the conventional example view of terminal electrode structure.
[Drawing 17] It is explanatory drawing of the conventional terminal electrode structure.
[Description of Notations]
1 Thin-Film-Circuit Element
2 Aluminum Pad
3 Four Conductive resin terminal area
5 Salient Formation Board
6 Impression
7 Squeegee
8 Mask
9 Conductive Resin Terminal Area
10 Metal Mask
11 Hole
21 Middle Metal Membrane
22 Copper-Plating Layer
23 Solder Bump
24 Golden Ball
25 Wiring Substrate
26 Wiring Contact Pads
27 Solder Precoat

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